

## **z390 GUAM GUI Graphical Access Method Guide v1.5.01**

### **z390 GUAM Graphical User Access Method Guide v1.5.01**

The z390 GUAM Graphical User Access Method provides support for any assembler program to interface with a user via a GUI window when the GUAM option is specified as an ez390 execution option. The following macro interfaces to the GUI window are supported:

- **WTO and WTOR interface similar to master console**
  - **WTO 'msg' – write to operator via GUAM GUI MCS console scrolling log view. See DEMOGUI1.MLC for example of simple WTO and WTOR wait loop.**
  - **WTOR 'msg',reply,reply\_length,ecb – write to operator with reply via GUAM GUI MCS console scrolling log view.**
  - **WAIT ECB=ecb – wait for WTOR reply from GUI interface and post ecb. See DEMOGUI2.MLC for example program that performs processing while waiting for reply.**
- **TGET and TPUT EDIT mode supports TSO TN3270 type interface**
  - **TGET buffer, buffer\_length, EDIT, WAIT – read next line of text from GUI TN3270 interface (the default is EDIT mode and WAIT for input from keyboard). See DEMOGUI3.MLC for example of loop with scrolling 3270 screen in edit mode.**
  - **TPUT buffer,buffer\_length – write next line of text to GUI TN3270 24 x 80 screen view (the default is EDIT mode)**
- **TGET and TPUT FULLSCN and ASIS modes support TN3270 data streams**
  - **TGET buffer, buffer\_len, ASIS, WAIT – read TN3270 data stream from GUAM GUI TN3270 screen interface. The TN3270 input stream consists of action code, cursor buffer address, and any modified input fields.**
  - **TPUT buffer, buffer\_len, FULLSCR – write TN3270 data stream to GUAM GUI TN3270 screen interface. The write buffer must contain escape followed by valid TN3270 extended data stream which may contain the following commands WCC, SF, SFE, SA, SBA, IC, PT, and EBCDIC data.**
  - **TN3270 – macro to generate native TN3270 data streams including SBA addresses using symbolic references for control codes.**
  - **See DEMOGUI6.MLC for assembler application program which supports updating of name, address, and numeric zip fields using GUAM macros and TGET/TPUT interface Note there is an EXEC CICS version of this same demo that runs via local or remote GUAM client TN3270 terminal connected to the z390 CICS compatible transaction manager contributed by Melvyn Maltz. The demo supports PF1 for help and PF3 for exit. It sounds alarm and displays errors on status line. It also displays the hex AID code for any other PF keys entered. To assemble, link, and execute the demo application, use the command ASMLG DEMO\DEMOGUI6 GUAM.**
  - **For technical reference manual see IBM 3270 Data Stream Programmers Reference GA23-0059-07 :**

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- For tutorial on TN3270 extended data stream programming with examples that you can download and run as is see the following site:  
<http://www.tommysprinkle.com/mvs/P3270/start.htm>
- The following keyboard input keystrokes can be used to generate TN3270 compatible input data codes:
  - ENTER key – 7D
  - PF1 – PF9 - F1-F9
  - PF10 – PF12 - 7A-7C
  - PF13 – PF21 - C1-C9 (may use CNTL+ALT+F1 to CNTL+ALT+F9)
  - PF22 – PF24 - 4A-4C (may use CNTL+ALT+F10 to CNTL+ALT+F12)
  - PA1 - 6C (may use CNTL+F1)
  - PA2 - 6E (may use CNTL+F2)
  - PA3 - 6B (may use CNTL+F3)
  - CLEAR - 6D (may use CNTL-C)
- **GUAM macro to perform graphics display functions similar to GDDM:**
  - WINDOW,TITLE,'text' – set window title
  - WINDOW,LOC,x,y – set window location from upper left in pixels
  - WINDOW,SIZE,width,height – set window size in pixels
  - WINDOW,FONT,size – set window character font size (8-30)
  - WINDOW,VIEW,MCS – set scrolling MCS console log view (default)
  - WINDOW,VIEW,SCREEN,row,col,color – set text screen view
  - WINDOW,VIEW,GRAPH,x,y,color – set graphic display view
  - WINDOW,GETVIEW,view – get current view
  - SCREEN,READ,buffer,buffer\_len,WAIT/NOWAIT – read text
  - SCREEN,WRITE,row,col,buffer,buffer\_len,color – write text
  - SCREEN,FIELD,row,col,length – define field
  - SCREEN,CURSOR, type – set cursor type
  - SCREEN,CURSOR,row,col – set cursor position
  - GRAPH,POINT,x,y,color – draw point
  - GRAPH,LINE,x1,y1,x2,y2,color – draw line
  - GRAPH,FILL,x1,y1,x2,y2,color – fill area
  - GRAPH,TEXT,x,y,'text',color – draw text
  - KEYBOARD,mode,char,WAIT/NOWAIT – read keyboard
  - MOUSE,x,y,left,right – read mouse position on graph and buttons
  - SOUND,START,wav\_file – play wav sound file
  - SOUND,STOP

When the ez390 GUAM option is specified for execution of a z390 assembler program, a GUAM GUI window is opened in default MCS console view displaying all WTO and WTOR messages issued by program in a scrolling window. Whenever TPUT, or TGET macros are executed the GUI window switches to TN3290 screen

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**view display mode. Whenever GUAM macro graphic commands are executed, the GUI window switches to GRAPH display mode. When in SCREEN or GRAPH view, WTO and WTOR commands can continue to be executed and displayed one at a time via the status line with command line replies as required. The user can switch between any of the 3 GUAM GUI views manually via view menu selection. Assembler application programs can set window title, location, size, font, and view mode at any time using the GUAM macros regardless of display view. Multiple user controlled GUAM GUI windows can be opened by executing different assembler programs as separate tasks under control of master program using the z390 CMDPROC macro to launch separate program tasks each of which can invoke a GUAM GUI interface.**

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**\*\*\*\* Note z390 v1.3.08 has the following GUAM GUI interface support and limits:**

- **Full support for the MCS console view for WTO and WTOR commands**
- **Full support for the TN3270 edit mode form of TGET and TPUT**
- **Full support for basic TN3270 data streams including WCC, SBA, SF, IC, RA, EUA, and PT commands. A cursor is supported using blinking underline character at the current cursor position. The arrow, backspace, delete, and tab keys are supported to control the cursor. Entering data into protected field or alpha into numeric field causes beep and status line error message. The 3270 screen display can be resized and the font is automatically adjusted to maximum size that will still allow display of full screen if possible.**
- **Limited support for TN3270 extended data streams with SFE and SA commands are supported. Color attributes are supported but highlighting and underlining are not yet supported.**
- **Limited support for the GUAM macro graphics commands. (The GUI WINDOW, VIEW, GRAPH command can be used to display the graph view but the graphic commands are targeted for future release.**

**The following GUI demo programs are included:**

1. **DEMOGUI1.MLC – Issue WTOR, wait for reply via WAIT, display reply via WTO and repeat loop until END is entered. This program can be run in any of the following modes:**
  - a. **Windows command line mode – ASMLG DEMO\DEMOGUI1**
  - b. **Windows GUI interface – ASMLG DEMO\DEMOGUI1 GUI**
2. **DEMOGUI2.MLC – Issue WTOR, execute 3 instruction loop until ECB is posted, display reply via WTO along with date, time, instruction loop count and calculated MIP rate for the 3 instruction loop. It is very interesting to note that on a 3 GHZ Pentium 4 system, this demo runs at about 1.1 MIPS using command line mode, and about 2.6 MIPS using the GUI mode. This program can be run in any of the following modes:**
  - a. **Windows command line mode – ASMLG DEMO\DEMOGUI1**
  - b. **Windows GUI interface – ASMLG DEMO\DEMOGUI1 GUI**
3. **DEMOGUI3.MLC – issue TPUT and TGET with WAIT option in loop until END is entered. This demo uses default EDIT mode of TPUT and TGET to scroll the 24 lines of TN3270 screen view with wrap around after status line prompt for input each time last line is written.**
4. **DEMOGUI4.MLC – issue TN3270 data stream TPUT and TGET with WAIT option in loop until END is entered. This demo writes text to fields at specified screen buffer addresses, reads a field at specified address, displays the input field at another address, and repeats the process waiting for screen input until PF3 or END is entered.**
5. **DEMOGUI5.MLC – This demo used GUI graphic commands to draw text and graphics and read keyboard and mouse. (Note this program brings up**

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- graphic display view but the graphics commands are not implemented yet – see RPI 137)
6. DEMOGUI6.MLC – TN3270 application program to support entering name, address, and numeric zip fields, displaying the current values, PF1 help screen, display hex value of any unused AID keys entered, and PF3 for exit.
  7. DEMOAPL1.MLC – show use of APL graphics via X'08' insert APL character command and also demo GUAM support of TN3270 color.

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